

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A solid component of catalyst for (co)polymerization of ethylene, comprising titanium, magnesium, chlorine, an organo-oxygenated protic compound D<sub>p</sub>, and a neutral electron-donor aprotic compound D, in the following molar ratio ranges:

$$\text{Mg/Ti} = 1.0\text{-}50; \quad \text{D/Ti} = 1.0\text{-}15;$$

$$\text{Cl/Ti} = 6.0\text{-}100; \quad \text{D}_p/\text{D} = 0.05\text{-}3,$$

and additionally comprising an inert granular solid, in a quantity ranging from 10 to 90% by weight with respect to the total weight of the solid component, wherein

the solid component is prepared by a process comprising in succession:

(a) forming of a mixture and dissolution, in aprotic electron-donor compound D, of a magnesium chloride and a titanium compound having formula (I):



and adding an inert granular solid,

wherein each R<sup>3</sup> represents a hydrocarbyl or acyl radical having from 1 to 15 carbon atoms,

each X is selected from the group consisting of chlorine, bromine and iodine; v is 3 or 4, and represents an oxidation state of titanium,

a is a number ranging from 0 to v, with a molar ratio between magnesium and titanium ranging from 1/1 to 50/1,

(b) partially separating the compound D from said mixture prepared in (a) until a residue is obtained, solid at room temperature, wherein the D/Ti ratio ranges from 1.5 to 40,

(c) forming a suspension of said solid residue in a liquid hydrocarbon medium,



(d) adding to said suspension of an organo-oxygenated protic compound  $D_p$ , in a quantity that the molar ratio  $D_p/D$  ranges from 0.1 to 1.2 and maintaining the mixture for a period varying from 5 minutes to 5 hours.

Claim 2 (Canceled).

Claim 3 (Currently Amended): The solid component according to claim [[2]] 1, wherein said inert granular solid is in a quantity ranging from 25 to 50% by weight.

Claim 4 (Currently Amended): The solid component according to claim [[2]] 1, wherein said inert granular solid is selected from the group consisting of: silica, titania, silico-aluminates, calcium carbonate and magnesium chloride; and the average size of the inert granule solid is from 10  $\mu\text{m}$  to 300  $\mu\text{m}$ .

Claim 5 (Previously Presented): The solid component according to claim 4, wherein said inert granular solid comprises microspheroidal silica having an average diameter ranging from 20 to 100  $\mu\text{m}$ , a BET surface area ranging from 150 to 400  $\text{m}^2/\text{g}$ , a total porosity equal or higher than 80% and an average pore radius of 50 to 200  $\text{\AA}$ .

Claim 6 (Previously Presented): The solid component according to claim 1, wherein the molar ratio ranges are:

$$\begin{array}{ll} \text{Mg/Ti} = 1.5\text{-}10; & \text{D/Ti} = 3.0\text{-}8.0; \\ \text{Cl/Ti} = 10\text{-}25; & \text{D}_p/\text{D} = 0.1\text{-}2.0. \end{array}$$



Claim 7 (Previously Presented): The solid component according to claim 1, wherein said ratio  $D_p/D$  ranges from 0.2 to 1.0.

Claim 8 (Previously Presented): The solid component according to claim 1, wherein said organo-oxygenated protic compound  $D_p$  comprises a compound having following formula (II):



wherein:

R is an aliphatic, cyclo-aliphatic or aromatic radical, optionally fluorinated, containing from 1 to 30 carbon atoms,

A is one of divalent groups having the formula  $CR^1R^2$ , CO, SCO and SO, wherein each  $R^1$  and  $R^2$  is independently hydrogen or an aliphatic or aromatic group having from 1 to 10 carbon atoms;

m is 0 or 1.

Claim 9 (Previously Presented): The solid component according to claim 1, wherein said organo-oxygenated protic compound  $D_p$  is selected from the group consisting of aliphatic or aromatic alcohols and organic acids, having from 2 to 10 carbon atoms.

Claim 10 (Previously Presented): The solid component according to claim 1, wherein said aprotic electron-donor compound D is a coordinating organic compound having from 3 to 20 carbon atoms, comprising at least one heteroatom of non-metallic compounds of groups 15 and 16.

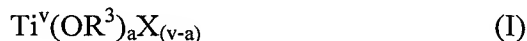


Claim 11 (Previously Presented): The solid component according to claim 1, wherein said electron-donor compound D is at least one selected from the group consisting of ketones, ethers, esters, amines, amides, thioethers, and xanthates, linear or cyclic, and aliphatic or aromatic, having from 4 to 10 carbon atoms.

Claim 12 (Previously Presented): The solid component according to claim 10, wherein said compound D is selected from the group consisting of dibutyl ether, dihexyl ether, methylethyl ketone, diisobutyl ketone, tetrahydrofuran, dioxane, ethyl acetate, and butyrolactone.

Claim 13 (Previously Presented): The solid component according to claim 1, wherein said titanium is present in a quantity ranging from 1 to 10% by weight.

Claim 14 (Withdrawn - Currently Amended): A process for preparation of the solid component according to claim 1, comprising in succession: (a) forming of a mixture and dissolution, in aprotic electron-donor compound D, of a magnesium chloride and a titanium compound having formula (I):



adding an inert granular solid,

wherein each  $\text{R}^3$  represents a hydrocarbyl or acyl radical having from 1 to 15 carbon atoms, ~~and adding an inert granular solid;~~

each X is selected from the group consisting of chlorine, bromine and iodine; v is 3 or 4, and represents an oxidation state of titanium,

a is a number ranging from 0 to v, with a molar ratio between magnesium and titanium ranging from 1/1 to 50/1;



(b) partially separating the compound D from said mixture prepared in (a) until a residue is obtained, solid at room temperature, wherein the D/Ti ratio ranges from 1.5 to 40,  
(c) forming a suspension of said solid residue in a liquid hydrocarbon medium,  
(d) adding to said suspension of an organo-oxygenated protic compound  $D_p$ , in a quantity that the molar ratio  $D_p/D$  ranges from 0.1 to 1.2 and maintaining the mixture for a period varying from 5 minutes to 5 hours.

Claim 15 (Canceled).

Claim 16 (Withdrawn): The process according to claim 15, wherein said granular solid is selected from the group consisting of: silica, titania, silico-aluminates, calcium carbonate, and magnesium chloride; the granular solid has an average granule size ranging from 10  $\mu\text{m}$  to 300  $\mu\text{m}$ .

Claim 17 (Withdrawn): The process according to claim 15, wherein said inert granular solid has microspheroidal silica having an average diameter ranging from 20 to 100  $\mu\text{m}$ , a BET surface area ranging from 150 to 400  $\text{m}^2/\text{g}$ , a total porosity equal or higher than 80% and an average pore radius of 50 to 200  $\text{\AA}$ .

Claim 18 (Withdrawn): The process according to claim 14, wherein said titanium compound having formula (I) is selected from the group consisting of titanium chlorides, bromides, alcoholates and carboxylates.

Claim 19 (Withdrawn): The process according to claim 14, wherein said compound having formula (I) in (a) is titanium trichloride.



Claim 20 (Withdrawn): The process according to claim 14, wherein said magnesium chloride is in amorphous form.

Claim 21 (Withdrawn): The process according to claim 14, wherein, in said (a), the atomic ratio between magnesium and titanium ranges from 1.0 to 50 and the ratio (D moles)/(Ti atoms) ranges from 5 to 100.

Claim 22 (Withdrawn): The process according to claim 14, wherein said (a) is carried out at a temperature ranging from room temperature to a boiling point of the donor compound D, until at least 80% of said compounds of Ti and Mg are dissolved.

Claim 23 (Withdrawn): The process according to claim 14, wherein said (b) is carried out by evaporation.

Claim 24 (Withdrawn): The process according to claim 14, wherein the molar ratio  $D_p/D$  in said (d) ranges from 0.2 to 1.2.

Claim 25 (Withdrawn): The process according to claim 14, wherein said (d) is carried out by heating the mixture to a temperature ranging from 40 to 100°C, for a period of time varying from 5 minutes to 5 hours.

Claim 26 (Withdrawn): The process according to claim 25, wherein the reaction mixture in said (d) is heated to a temperature of 60 to 80°C, for a period ranging from 5 to 60 minutes.



Claim 27 (Withdrawn): A process for preparation of a solid component according to claim 1, comprising reacting in an inert liquid medium, a solid precursor comprising titanium, magnesium, chlorine, an aprotic electron-donor compound D and optionally an inert granular solid, in following molar ratios:

$$\text{Mg/Ti} = 1\text{-}50; \quad \text{D/Ti} = 2.0\text{-}20; \quad \text{Cl/Ti} = 6\text{-}100;$$

and wherein said inert granular solid is in a quantity ranging from 0 to 95%,

with protic organo-oxygenated compound  $D_p$ , in a quantity that the molar ratio  $D_p/D$  ranges from 0.1 to 1.2, until equilibrium is reached.

Claim 28 (Withdrawn): The process according to claim 27, wherein said molar ratios are:

$$\text{Mg/Ti} = 1.5\text{-}10; \quad \text{D/Ti} = 4.0\text{-}12; \quad \text{Cl/Ti} = 10\text{-}30$$

and said inert granular solid is in a quantity ranging from 20 to 60% by weight with respect to the total weight of the precursor.

Claim 29 (Withdrawn): The process according to claim 27, wherein the molar ratio  $D_p/D$  ranges from 0.2 to 1.2.

Claim 30 (Withdrawn): The process according to claim 27, wherein said reaction is carried out at a temperature ranging from 40 to 100°C, for a period varying from 5 minutes to 5 hours.

Claim 31 (Withdrawn): The process according to claim 30, wherein said reaction is carried out at a temperature ranging from 60 to 80°C, for a period of 5 to 60 minutes.



Claim 32 (Withdrawn): A catalyst for (co)polymerization of ethylene, wherein the catalyst is obtained by a process comprising reaction of said solid component according to claim 1, with a co-catalyst comprising a hydrocarbyl compound of a metal selected from the group consisting of Al, Ga, Mg, Zn and Li, wherein the atomic ratio between the metal in the co-catalyst and titanium in the solid component of catalyst ranges from 10:1 to 500:1.

Claim 33 (Withdrawn): The catalyst according to claim 32, wherein the atomic ratio between the metal in the co-catalyst and titanium in the solid component of catalyst ranges from 50:1 to 200:1.

Claim 34 (Withdrawn): The catalyst according to claim 32, comprising titanium, magnesium, aluminum and chlorine, wherein said co-catalyst comprises an alkyl organometallic compound of aluminum.

Claim 35 (Withdrawn): The catalyst according to claim 34, wherein said organometallic compound of aluminum is at least one of aluminum tri-alkyls comprising from 1 to 10 carbon atoms in each alkyl group.

Claim 36 (Withdrawn): The catalyst according to claim 32, wherein said solid component is activated before contact with said co-catalyst, by reaction with an aluminum alkyl or alkyl chloride represented by following general formula (III):



wherein: R' is a linear or branched alkyl radical containing from 1 to 20 carbon atoms, X is one of H and Cl and n is a decimal number having a value ranging from 1 to 3; and



an  $\text{Al}/(\text{D}+\text{D}_p)$  ratio between the aluminium moles in said compound having formula (III) and the total of D and  $\text{D}_p$  moles in said solid component, ranges from 0.1 to 1.5.

Claim 37 (Withdrawn): The catalyst according to claim 36, wherein said  $\text{R}'$  in formula (III) is a linear or branched aliphatic radical, having from 2 to 8 carbon atoms.

Claim 38 (Withdrawn): The catalyst according to claim 37, wherein said  $\text{Al}/(\text{D}+\text{D}_p)$  ratio ranges from 0.2 to 1.3.

Claim 39 (Withdrawn): The catalyst according to claim 36, wherein said solid component is activated by a first reaction with an aluminum trialkyl ( $n = 3$  in formula (III)), and successively in a second reaction with an aluminum dialkyl chloride ( $n = 2$ ,  $\text{X} = \text{Cl}$ , in formula (III)), in a quantity that the overall molar ratio  $\text{Al}/(\text{D}+\text{D}_p)$  ranges from 0.1 to 1.3.

Claim 40 (Withdrawn): The catalyst according to claim 38, wherein, in said first reaction, the molar ratio  $\text{AlR}_3/(\text{D}+\text{D}_p)$  ranges from 0.1 to 0.4 and, in the second reaction, the molar ratio  $\text{AlR}_2\text{Cl}/(\text{D}+\text{D}_p)$  ranges from 0.2 to 0.6.

Claim 41 (Withdrawn): A process for (co)polymerization of ethylene, comprising reacting ethylene and optionally at least one alpha-olefin, under a polymerization condition, in the presence of said catalyst according to claim 32.

Claim 42 (Withdrawn): The process according to claim 41, comprising carrying out a fluid-bed method, wherein a gaseous stream of ethylene and optional alpha-olefin is reacted in the presence of a quantity of catalyst, wherein a titanium concentration ranges from 1 to 5



ppm by weight with respect to a consolidated production, at a temperature ranging from 70 to 115°C, and at a pressure ranging from 500 to 1000 kPa.

Claim 43 (Withdrawn): The process according to claim 42, wherein said stream is introduced from the bottom of the polymerization reactor, partially comprising a stream in liquid form.

Claim 44 (Withdrawn): The process according to claim 42, wherein said gaseous stream comprises ethylene and alpha-olefin.

Claim 45 (Withdrawn): The process according to claim 41, wherein the molar ratio with ethylene ranges from 0.1 to 1.0.

Claim 46 (Withdrawn): The process according to claim 41, wherein said  $\alpha$ -olefin is one of 1-butene, 1-hexene and 1-octene and is in a quantity that the molar ratio with ethylene ranges from 0.1 to 0.4.

Claim 47 (Withdrawn): The process according to claim 41, comprising obtaining linear polyethylene having a density ranging from 0.915 to 0.950 g/ml.

Claim 48 (Withdrawn): The process according to claim 42, comprising obtaining linear polyethylene having a density lower than 0.915 g/ml and copolymerizing, in gas phase, a gaseous mixture comprising ethylene and at least one alpha-olefin having from 4 to 10 carbon atoms.



Claim 49 (Withdrawn): The process according to claim 48, wherein the gaseous mixture of ethylene and the at least one alpha-olefin is reacted in the presence of a sufficient quantity of catalyst, at a temperature ranging from 70 to 95°C, and a pressure ranging from 500 to 1000 kPa.

Claim 50 (Withdrawn): The process according to claim 48, wherein said alpha-olefin is one of 1-butene, 1-hexene and 1-octene, and is in a quantity that the molar ratio with respect to ethylene ranges from 0.1 to 0.4.

Claim 51 (Withdrawn): The process according to claim 41, wherein said catalyst is formed *in situ* inside the reactor.

Claim 52 (Withdrawn): The process according to claim 41, wherein said linear polyethylene has a weight average molecular weight  $M_w$  ranging from 20,000 to 500,000 and a MWD ( $M_w/M_n$ ) distribution ranging from 2.5 to 4.

Claim 53 (New): The solid component according to claim 1, wherein said granular solid is selected from the group consisting of: silica, titania, silico-aluminates, calcium carbonate, and magnesium chloride; the granular solid has an average granule size ranging from 10  $\mu\text{m}$  to 300  $\mu\text{m}$ .

Claim 54 (New): The solid component according to claim 1, wherein said titanium compound having formula (I) is selected from the group consisting of titanium chlorides, bromides, alcoholates and carboxylates.



Claim 55 (New): The solid component according to claim 1, wherein said compound having formula (I) in (a) is titanium trichloride.

Claim 56 (New): The solid component according to claim 1, wherein said magnesium chloride is in amorphous form.

Claim 57 (New): The solid component according to claim 1, wherein, in said (a), the atomic ratio between magnesium and titanium ranges from 1.0 to 50 and the ratio (D moles)/(Ti atoms) ranges from 5 to 100.

Claim 58 (New): The solid component according to claim 1, wherein said (a) is carried out at a temperature ranging from room temperature to a boiling point of the donor compound D, until at least 80% of said compounds of Ti and Mg are dissolved.

Claim 59 (New): The solid component according to claim 1, wherein said (b) is carried out by evaporation.

Claim 60 (New): The solid component according to claim 1, wherein the molar ratio  $D_p/D$  in said (d) ranges from 0.2 to 1.2.

Claim 61 (New): The solid component according to claim 1, wherein said (d) is carried out by heating the mixture to a temperature ranging from 40 to 100°C, for a period of time varying from 5 minutes to 5 hours.



Claim 62 (New): The solid component according to claim 61, wherein the reaction mixture in said (d) is heated to a temperature of 60 to 80°C, for a period ranging from 5 to 60 minutes.